

SCHEMATIC DIAGRAM FOR 1-537-1, 540-1-3 TV CHASSIS

USE POWER LINE ISOLATION TRANSFORMER WHEN SERVICING THE CHASSIS.
 PICTURE TUBE HIGH VOLTAGE ANODE LEAD MAY HAVE A POTENTIAL OF 16,000 VOLTS. OBSERVE ALL HIGH VOLTAGE PRECAUTIONS WHEN SERVICING THE CHASSIS. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COVER REMOVED.

USE SAFETY GOGGLES AND GLOVES WHEN HANDLING THE PICTURE TUBE.

IMPORTANT
 READ THESE INSTRUCTIONS CAREFULLY AND OBSERVE THE CONDITIONS NOTED WHEN TAKING VOLTAGE READINGS OR OBSERVING WAVEFORMS.
 VOLTAGE MEASUREMENT CONDITIONS UNLESS OTHERWISE SPECIFIED:
 1. VOLTAGE MEASURED TO CHASSIS USING SYLVANIA POLY-METER (SYM).
 2. AC POWER SOURCE 117V, 60 CYCLE LINE.
 3. CONTRAST CONTROL SET TO STRONG CHANNEL.

SIGNAL INPUT, CHANNEL SELECTOR SET TO FREE CHANNEL. ANTENNA DISCONNECTED. ANTENNA TERMINALS SHORTED TOGETHER AND GROUND TO CHASSIS.
 VOLTAGE READINGS NOT IN BRACKETS TAKEN WITH A STRONG SIGNAL INPUT. TUNER SET TO STRONG LOCAL STATION DEVELOPING APPROXIMATELY 7% ON IF AGC BUS (FUNCTION OF C-203 & R-205.)
 CHANNEL SELECTOR SET TO STRONG CHANNEL.

TUNER SET TO MINIMUM
 6. VOLTAGE VALUES SHOWN ARE AVERAGE READINGS. VARIATIONS MAY BE OBSERVED DUE TO NORMAL PRODUCTION TOLERANCES.

SPECIAL VOLTAGE MEASUREMENT CONDITIONS:
 PICTURE TUBE ANODE VOLTAGE MEASURED WITH VTVM HIGH VOLTAGE PROBE AT LINE OF VOLTAGE OF 117V. UNDER CONDITIONS OF NORMAL SIGNAL, NO BRIGHTNESS AND CORRECT SCAN SIZE.
 HIGH PEAK VOLTAGE OF SHORT DURATION MAY DAMAGE METER USED FOR THIS MEASUREMENT.

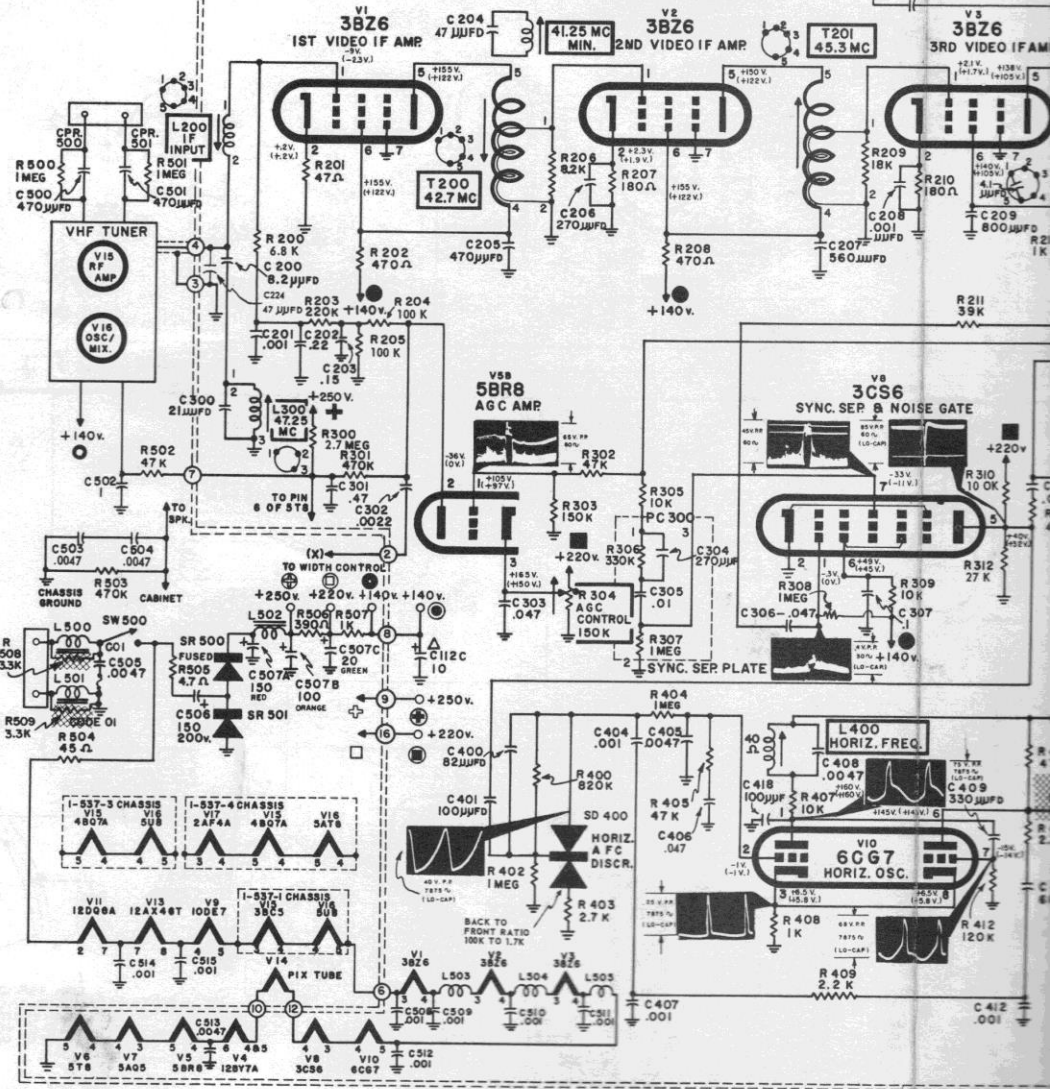
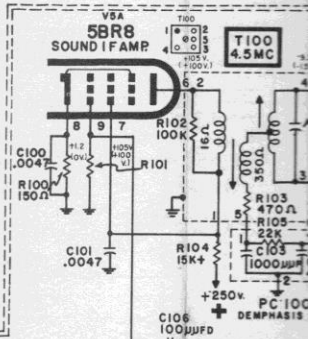
WAVEFORM MEASUREMENT CONDITIONS:
 1. CHANNEL SELECTOR SET TO STRONG CHANNEL.

2. CONTRAST CONTROL SET FOR SIGNAL OF 80V. PP AT (YELLOW LEAD OF PICTURE TUBE).
 3. WAVEFORMS MEASURED WITH RESPECT TO CHASSIS USING SYLVANIA TYPE 40K OSCILLOSCOPE. (OTHER TYPE OSCILLOSCOPES MAY ALTER WAVEFORM SHAPES OR AMPLITUDES.)
 4. THE TERMS "40V" OR "78.5V" REFER TO SCOPE SWEEP FREQUENCY USED. WAVEFORMS MARKED "NO-GAP" TAKEN WITH LOW CAPACITY 10:1 VOLTAGE DIVIDER TYPE SCOPE PROBE. (MULTIPLY CALIBRATOR READING BY 10)

WITHOUT CIRCLES INDICATE VOLTAGE TIE POINTS.
 AVERAGE RESISTANCES OF COILS AND TRANSFORMERS ARE SHOWN AND ARE MEASURED WITH COMPONENT CONNECTED IN CIRCUIT. (EXCEPTIONS TO THIS RULE ARE INDICATED AT THE EDGE OF PRINTED CIRCUIT INDICATED TIE POINTS.)
 SHADDED AREAS DENOTE CODE CHANGES.

GENERAL SCHEMATIC NOTES
 1. VOLTAGE SOURCES ARE INDICATED BY EN CIRCLED SYMBOLS.
 2. RESPONDING SYMBOLS

PARTS COOKING
 TUNER SECTION - 1-199
 SOUND SECTION - 100-199
 VIDEO SECTION - 200-299
 HORIZ. & SYNC SECTION 300-399
 HORIZ. & H. SYNC SECTION 400-499
 I. V. POWER SUPPLY - 500-599
 FIL. AND WISC..... 600-699





TELEVISION Service Manual

PUBLISHED BY RADIO COLLEGE OF CANADA, TORONTO

1957 Supplement No. 27

GORDON OLIVER TELEVISION PHILIPS INDEX 923 CALVERHALL ST. YO 4810 NORTH VANCOUVER, B.C.

ADMIRAL NORTH VANCOUVER, B.C.
Chassis: 3890 Circuit Tuner circuits
3890 Same as 3820.
3831 Same as 3820.

| | |
|-------------------------------------|---------|
| 14YF9BX Circuit | Page 46 |
| 14YF9BX Tuner circuits | 46 |
| 14YF9BX Alignment | 10 11 |
| 14YF9BX Chassis layouts | 2 to 6 |
| 14YF9BX Service hints | 7, 8 |
| 14YF9BX Identification | 7 to 9 |
| 14YF9BX Same as 14YF9BX | 10 |
| 14YF9DX Circuit | 48, 50 |
| 14YF9DX Other data same as 14YF9BX. | |
| 14YF9DX Same as 14YF9DX. | |

Model:

T101X to T104X See chassis 14YF9BX or DX.
T105 to T108 See chassis 14YF9BX or DX.
T143X, T143Y See chassis 14YF9BX or DX.
T144ALX, T144ALY See 14YF9BX or DX.
T171X, T172X See 14YF9BX or DX.
T179ALX See 14YF9BX or DX.

ELECTROHOME

Model:

Balfour-A Circuit, 51, 52
Balfour-A Tuner circuit, 12
Balfour-A Chassis layouts, 12 & 14
Balfour-A Coil identification, 12 & 14
Berkeley-A Same as Balfour-A.

PHILCO

Chassis:

| | |
|--------------------------|-------------------------|
| 7E10 Circuit | Page 55, 54 |
| 7E10 Tuner circuits | 16 |
| 7E10 Alignment | 15 & 20 |
| 7E10 Waveforms | 17 to 22 |
| 7E10 Coil identification | 15 |
| 7E10-U Same as 7E10. | |
| 7E11 Same as 7E10. | |
| 7H20 Circuit | 55, 56 |
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| 7H20 Alignment | 26 to 24 |
| 7H20 Chassis layouts | 25, 30 |
| 7H20 Waveforms | 25 |
| 7H20 Coil identification | 25 |
| 7H20-U-25 Same as 7H20. | |
| 7L40 Tuner circuits | 57, 58 |
| 7L40 Alignment | 34, 37 |
| 7L40 Sound panel | 32, 33, & 40 |
| 7L40 Chassis layouts | 31, 34, 35, 39, 41 & 42 |
| 7L40 Coil identification | 38 |
| 7L40 Waveforms | 38 |
| 7L40-U Same as 7L40. | |
| 7L45 Same as 7L40. | |

SYLVANIA NORTHERN ELECTRIC

Chassis:

| | |
|-----------------------------|-------------|
| 1-537-1 Circuit | Page 65, 66 |
| 1-537-1 Tuner circuit | 66 |
| 1-537-1 Alignment | 67 |
| 1-537-1 Chassis layouts | 95, 96 |
| 1-537-1 Production changes | 95 |
| 1-537-1 Coil identification | 95 |
| 540-1-3 Same as 1-537-1. | 94 |

Model:

17P201 See 1-537-1.
21T114 See 1-537-1.
21T215 See 1-537-1.
21C400 See 1-537-1.
21C512 See 1-537-1.
21C512 See 1-537-1.
HaloLight 60-cycle conversion all models.

WESTINGHOUSE

Model:

2V17T See chassis L-2346.
2V18K See chassis L-2346.

ROGERS-MAJESTIC

Model:

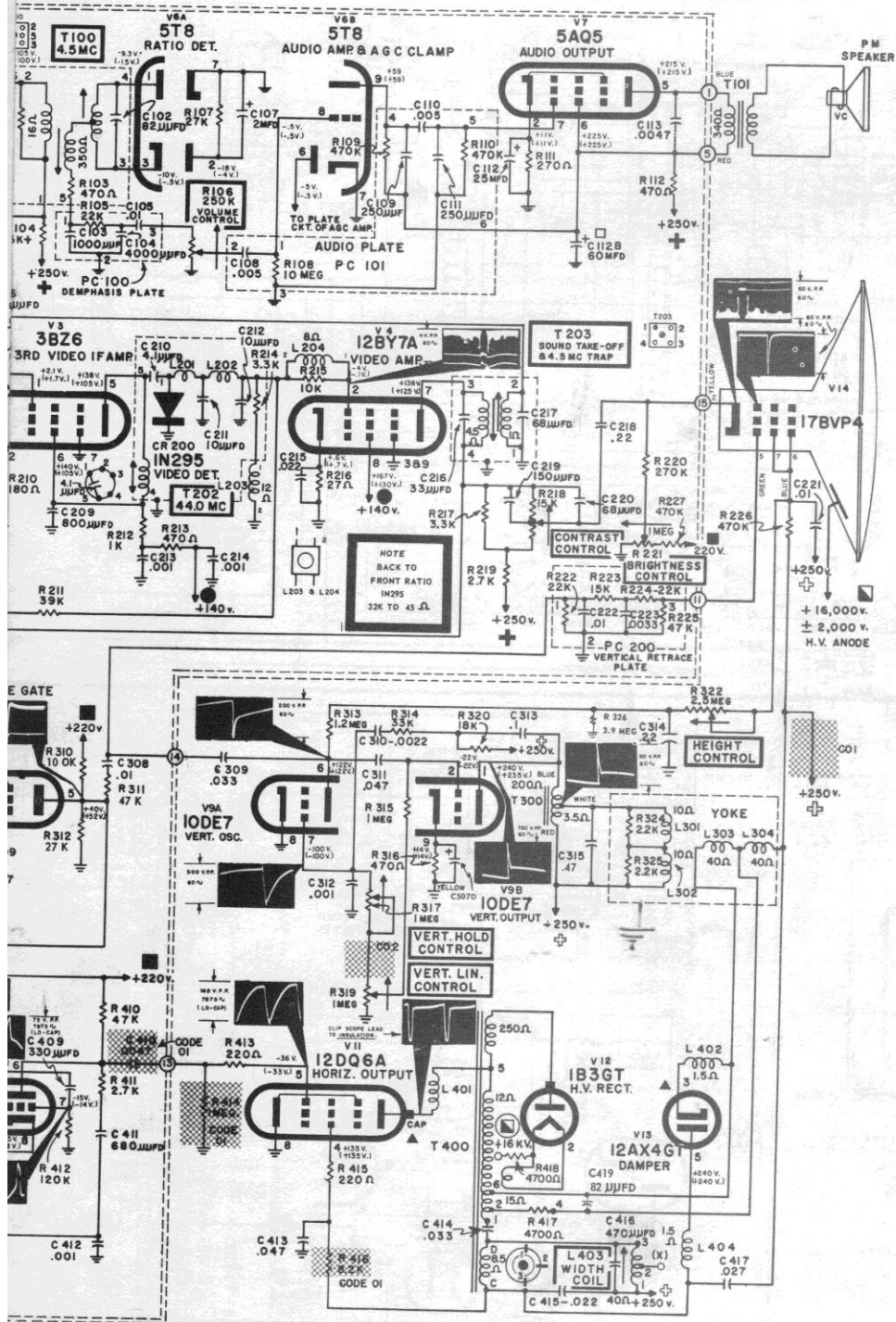
| | |
|---------------------|-------------|
| 7620 Circuit | Page 59, 60 |
| 7620 Tuner circuits | 60 |
| 7630 Same as 7620. | |
| 7631 Same as 7620. | |

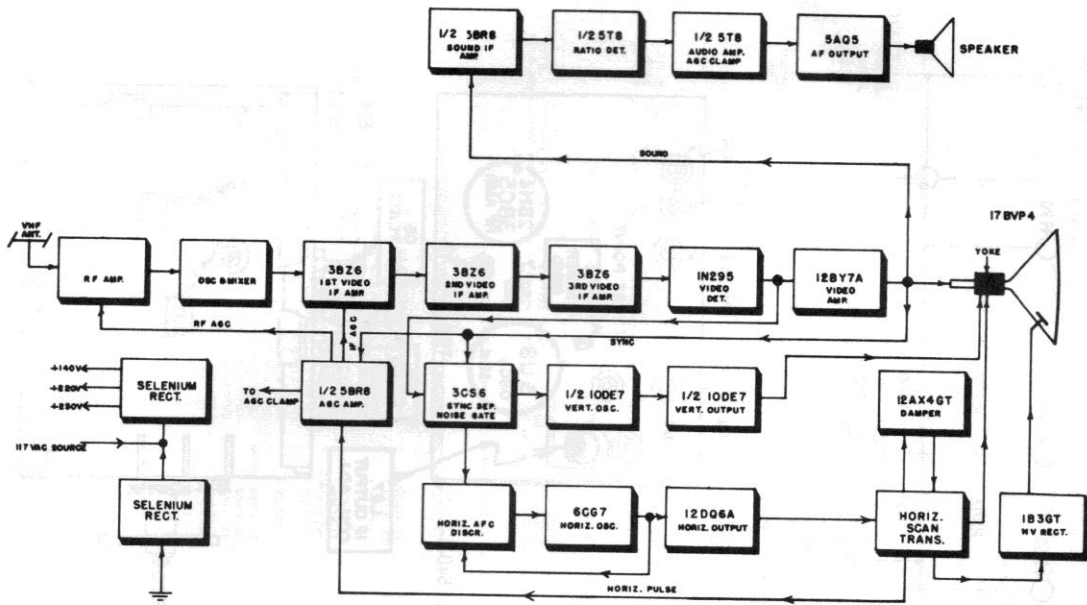
SPARTAN

Chassis:

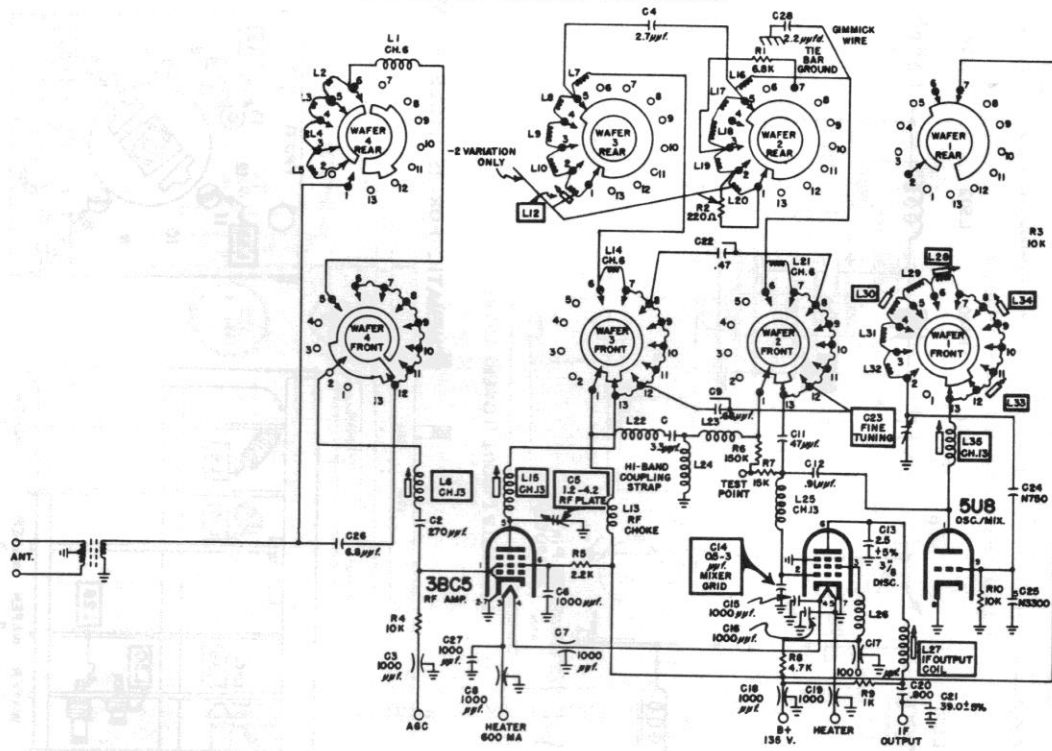
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|--------------------------|-------------|
| 1001 Circuit | Page 61, 62 |
| 1001 Tuner circuit | 62 |
| 1001 Alignment | 60 |
| 1001 Chassis layouts | 63, 64 |
| 24F1 Alignment | 91 |
| 24F1 Chassis layouts | 92 |
| 24F1 Coil identification | 91 |

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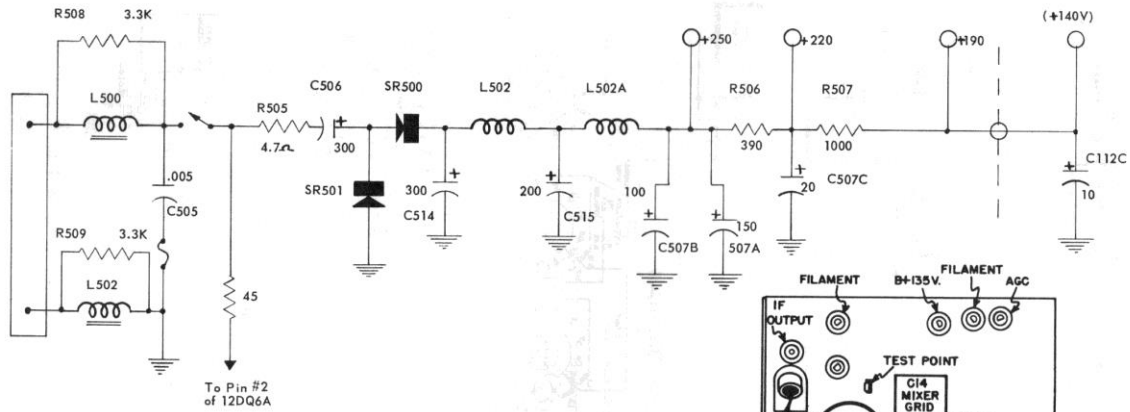




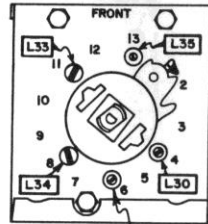
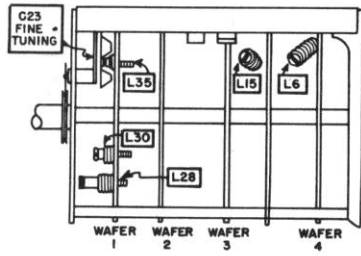
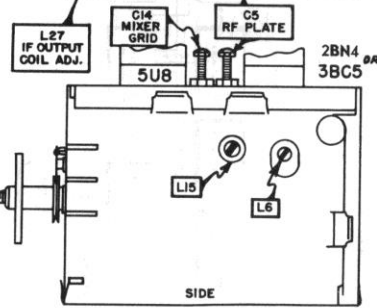
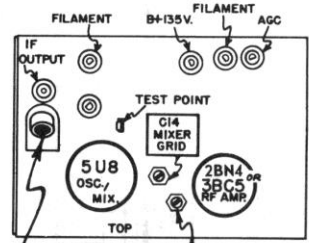
CHASSIS BLOCK DIAGRAM



VHF TUNER SCHEMATIC PROD. NO. 54-94698-1

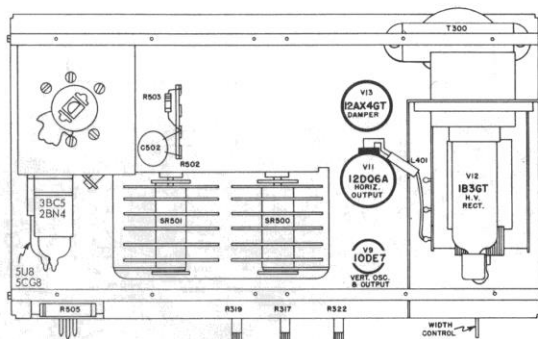


SCHEMATIC FOR 25 CYCLE B+ 537-1 540-1-3

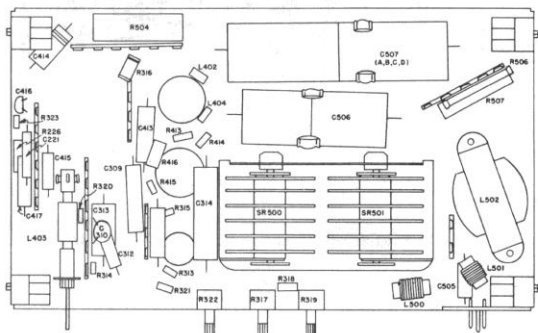


VHF TUNER PARTS LAYOUT PROD. NO. 54-94698-1

SYLVANIA NORTHERN ELECTRIC
1-537-1, 540-1-3



TOP PARTS LAYOUT (LOWER) CHASSIS



BOTTOM PARTS LAYOUT (LOWER) CHASSIS

CODE CHANGE 04: PRINTED CIRCUIT BOARD MODIFIED TO REVISION "A" AND COMPONENTS THAT WERE HUNG UNDERNEATH HAVE BEEN PROPERLY POSITIONED.

A RESISTOR 100-094 1/2 WATT HAS BEEN ADDED IN SERIES WITH THE 1N295 CRYSTAL DIODE TO REDUCE SWEET ON CHANNEL "B".

CHOKES, COILS AND TRANSFORMERS

| | | |
|------------------------|------------------|--|
| L200 | 57-85964-1 | Coil If Input |
| L201 | 50-91531-1 | Coil Filter |
| L202 | 50-91531-1 | Coil Filter |
| L203 | 50-95953-1 | Coil Peaking 330 uh |
| L204 | 50-85053-2 | Coil Peaking 160 uh |
| L300 | 50-85965-1 | Coil Trap |
| L301, L302, L303, L304 | | See "Miscellaneous Electric Parts" |
| L400 | 50-85957-1 | Coil Horizontal Frequency Control |
| L401 | 50-92043-1 | Coil Filter |
| L402 | 50-92043-1 | Coil Filter |
| L403 | 50-94358-1 | Coil With Control |
| L404 | 50-92043-1 | Coil Filter |
| L500 | 50-95698-2 | Choke Line Filter |
| L501 | 50-95698-2 | Choke Line Filter |
| L502 | 56-91598-1-2-3-4 | Choke II Filter |
| L503 | 50-85963-1 | Coil Filament |
| L504 | 50-85963-1 | Coil Filament |
| L505 | 50-85963-1 | Coil Filament |
| T100 | 50-85968-1 | Transformer Sound Discriminator |
| T101 | see speaker | Transformer Audio Output |
| T200 | 57-85960-1 | Transformer If Interstage #1 |
| T201 | 57-85960-1 | Transformer If Interstage #2 |
| T202 | 57-85955-1 | Transformer If Output |
| T203 | 57-85942-1 | Transformer Sound If & Trap |
| T300 | 56-94273-1 | Transformer Vertical Output |
| T400 | 50-94292-1 | Transformer Horizontal Scan & High Voltage |

MODIFICATIONS AND CODE CHANGES 1-537-1, 540-1-3 CHASSIS

NOTE 1:

CODE CHANGES ON SCHEMATIC DIAGRAM SHOULD BE DISREGARDED.

NOTE 2: 25 CYCLE

A 25 MFD 15 V ELECTROLYTIC CONDENSER PART NO. 41-95780-1 HAS BEEN PLACED ACROSS CHOKES L502 WITH POSITIVE END TO JUNCTION L502, L503A AND C514 TO IMPROVE INTERLACE ON 25 CYCLE PORTABLE. THIS HAS BEEN ADDED TO ALL 25 CYCLE SETS PRODUCED.

NOTE 3:

WAVEFORMS AT THE SELENIUM DIODE (50400) AND AT THE CAP OF 12DQ6A ARE REVERSED.

NOTE 4:

AN OAK PENTODE TUNER IS BEING USED 54-94598-3. THE DIFFERENCE IN TUNERS BETWEEN THE -1 AND -3 IS AS FOLLOWS: THE -3 TUNER HAS A 47 UHF. CAPACITOR INSTALLED IN THE TUNER T18E1F AND C224 IS NOT NEEDED BETWEEN POINTS 3 AND 4 AS INDICATED ON THE SCHEMATIC. WHEN THE -3 TUNER IS USED AS A FIELD REPLACEMENT FOR A -1 ON A NEUTRODE C224 MUST BE REMOVED. OTHERWISE IT WILL BE IMPOSSIBLE TO ALIGN THE OVERALL I.F. BANDPASS.

CODE CHANGE 01

REASON FOR CHANGE: NEUTRODE TUNER USED.
CODE CHANGE EFFECTIVE: 537-1C-01-08-0001

NEUTRODE TUNER PART NO. 54-95560-1

CODE CHANGE 02

TO IMPROVE VERTICAL SCAN DURING "WARM UP"

THE FOLLOWING COMPONENTS HAVE BEEN CHANGED:

- 1 R300 (2.7 MEG.) RESISTOR CHANGED TO (3.9 MEG.) RESISTOR.
2. R225 (470 K) RESISTOR CHANGED TO THERMISTOR (500 K AT 25°C).
3. ADD A THERMISTOR 500K 38-95933-1 ACROSS C313 1 CAPACITOR AS INDICATED.

TO IMPROVE SYNC STABILITY

PLATE SYNC TAKEOFF 32-85946-1 HAS BEEN REPLACED BY PLATE SYNC TAKEOFF 32-88098-1

FACTORY CHANGE

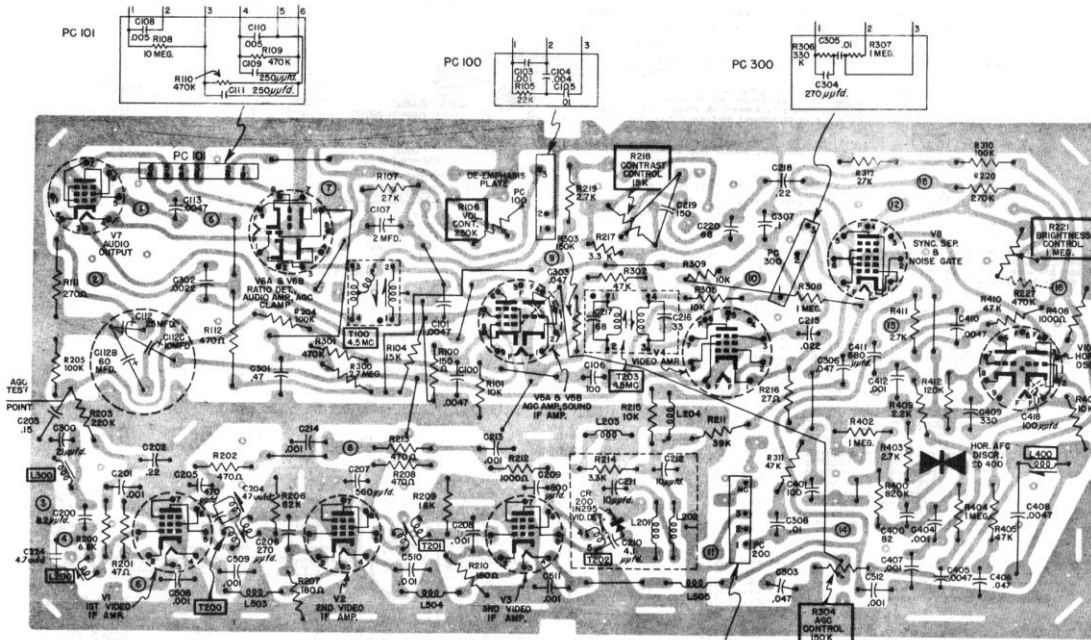
ADD A .001 CAPACITOR FROM PLATE PIN #6 ON 5B A.D.C. CLAMP TO GROUND.
CAPACITOR C505, .0047 MFD. 600V IS CHANGED TO .0025 MFD. 900V.
THE PART NUMBER FOR THIS CAPACITOR IS 43-93010-1

CODE CHANGE 03

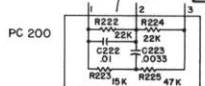
TETRODE TUNER USED PART NO. 54-95590-1 C224 CHANGED TO 39 MMFD.

THE CAPACITOR C224 WILL BE ADDED ACROSS POINTS 3 AND 4 FOR ABOUT 1000 SETS. IT WILL THEN BE ADDED INSIDE TUNER AS IN THE PENTODE TUNER. SEE NOTE 4.

• TOP DECK - PRINTED BOARD ASSEMBLY •

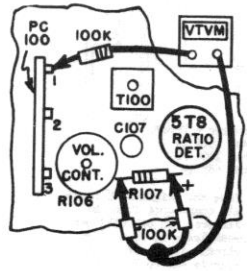
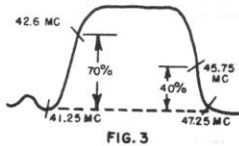
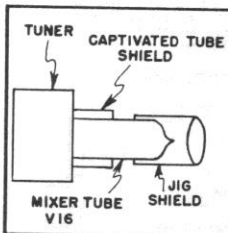
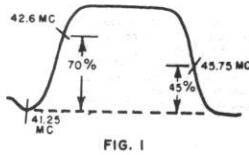


The illustration above represents the assembly as viewed from the component side (top) of the board. The foil side (bottom) is represented in "shadow" effect. Circuit tracing can therefore be accomplished from the top without removing the chassis from the cabinet.



SYLVANIA NORTHERN ELECTRIC
1-537-1, 540-1-3

1. Connect an isolation transformer between chassis and power line.
2. Use high scope gain and keep sweep generator output at lowest usable value; check at intervals, for possible sweep generator overloading by temporarily varying signal input level and noting any change (excluding amplitude) in response curve shape.
3. Keep marker generator coupling to a minimum to avoid distortion of response curve.
4. For optimum receiver alignment power line voltage should be maintained at 117 volts.
5. Receiver and test equipment should warm up for approximately 15 minutes before alignment.



•PARTIAL TOP VIEW OF PRINTED CIRCUIT •
FIG. 4

| VIDEO IF ALIGNMENT | | | |
|--|---|---|---|
| STEP | ALIGNMENT SETUP NOTES | TEST EQUIPMENT HOOKUP | ADJUST |
| 1. | <p>Set VHF tuner to a free channel</p> <p>Connect 9 Volts DC source () term to junction of R205 (56K) and C203 (15 Mfd) and (+) term. to chassis</p> <p>Detune tuner converter plate coil by turning core fully counter clockwise.</p> | <p>SWEEP GENERATOR through a 0047 Mfd DC blocking capacitor to pin 5 of L200. Set generator to 43.5 MC with 10 MC sweep.</p> <p>SIGNAL GENERATOR Loosely coupled as a marker to sweep generator lead</p> <p>OSCILLOSCOPE connected to pin 2 of L204 (video detector load resistor) through a 33K resistor</p> | <p>a. ADJUST sweep generator output to produce response curve of 3V peak to peak.</p> <p>b. ADJUST T200 (top core) so that dip in response curve coincides with proper marker frequency (41 25).</p> <p>c. ADJUST T202 for MAXIMUM response at 44 0 MC</p> <p>d. ADJUST T201 for MAXIMUM response at 45 3 MC</p> <p>e. ADJUST T200 (bottom core) for MAXIMUM response at 42 7 MC</p> <p>f. Repeat steps C to E until 45 75 MC marker is at 45% and 42 6 MC marker is at 50%.</p> <p>ADJUST T202 to remove tilt ADJUST T201 to position 45.75 MC marker ADJUST T200 (bottom core) to position 42.6 MC marker. See Fig. 1</p> |
| 2. | Same as step 1 | <p>SWEEP GENERATOR through 0047 Mfd DC blocking capacitor to VHF IF cable at chassis tie point (no. 4)</p> <p>OSCILLOSCOPE same as step 1.</p> | <p>ADJUST L300 for MINIMUM 47 25 MC marker amplitude.</p> <p>For optimum results repeat steps 1 & 2.</p> |
| 3. | <p>Leave 9 volt AGC voltage connected as in step 1</p> <p>Set VHF tuner to a high band VHF channel which causes minimum distortion of response curve as fine tuning control is rotated.</p> | <p>SWEEP GENERATOR to jig shield on mixer tube (V16). See Fig. 2</p> <p>OSCILLOSCOPE same as step 1 & 2.</p> | <p>ADJUST tuner converter plate and L200 to give response shown below See Fig. 3</p> <p>For optimum results repeat steps 1 & 3, but do not detune tuner.</p> |
| •Remove all test equipment, resistors• | | | |
| 4 5 MC TRAP SOUND IF & RATIO DETECTOR ALIGNMENT | | | |
| STEP | ALIGNMENT SETUP NOTES | TEST EQUIPMENT HOOKUP | ADJUST |
| 1. | <p>Set contrast control to maximum and brightness control to minimum.</p> <p>Connect 45 volts DC source () term to junction of R205 (56K) & C203 (15 Mfd) and (+) term. to chassis</p> <p>Connect a 4.5 MC series tuned circuit between yellow cathode lead of picture tube and ground.</p> | <p>VTVM ground or "common" lead to junction of two matched 100K resistors connected in series across R107 (27K) DC probe through 100K resistor to terminal 1 of de-emphasis plate (PC 100). ISOLATE VTVM FROM GROUND. See Fig. 4</p> <p>SIGNAL GENERATOR connected to pin 2 of L204 (video detector load resistor) Set signal generator to 4 5 (preferably crystal calibrated or controlled).</p> | <p>For MAXIMUM reading T100 (top core) T100 (bottom core) T203 (bottom core) T203 (top core) Note use peak resulting in greatest separation of cores.</p> |
| 2. | Same as step 1 | <p>VTVM RF probe connected across coil of series tuned 4 5 MC circuit</p> <p>SIGNAL GENERATOR - same as step 1</p> | <p>For MINIMUM reading T203 (bottom core).</p> <p>Using lowest signal generator output level repeat steps 1 & 2 except T203 (bottom core).</p> |
| 3. | Same as step 1 & 2. | Same as step 1 | <p>For ZERO reading of T100 (top core).</p> <p>Set VTVM to zero center using lowest meter scale. At correct setting for T100 (top core), a slight turn of core will give a reading either up or down the scale.</p> |
| •Remove test equipment and resistors• | | | |
| ALTERNATE 4.5 MC ALIGNMENT | | | |
| <p>• Connect a good antenna to the receiver and properly tune in a strong station. Adjust L202 for minimum 4.5 MC interference in the picture. This interference takes the form of a "grainy" appearance or a fine line pattern through the picture. •</p> | | | |

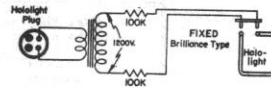
SYLVANIA NORTHERN ELECTRIC Halolight 60 cycle conversion

25 CYCLE HALOLIGHT CONVERSION TO 60 CYCLE

The enclosed information on conversion from 25 cycle to 60 cycle has been prepared to assist the serviceman in converting the halolight supply to 60 cycle operation due to 25 cycle area in Ontario being gradually reduced, and many receivers which were designed for 25-60 cycle operation are being used exclusively on 60 cycle. The conversion information and parts that are listed for each cabinet model is all that is necessary to convert a particular halolight supply for 60 cycle operation. In all cabinet models it will be possible to use existing brackets, terminal boards and plugs. This is done with the view in mind that very few additional parts will be required. It is suggested that prior to starting the conversion a study is made of each supply to determine which wires and components need to be moved from the original 25 cycle supply. Also bear in mind that on series string filament receivers, the 6Xh tube in the original 25 cycle supply must be left in the circuit (filament only) to complete the series filament string. Only Allen Bradley or Ohmite resistors must be used when the conversion is made.

CABINET MODELS

612, 520, 620, 621

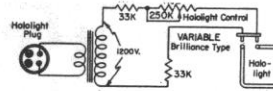


55-93706-4 Transformer - Power
35-631041-2 Resistor 100K 2W

Use brackets and terminal board from the original 25 cycle supply.

CABINET MODELS

525, 526, 575, 577, 626, 675, 677, 217301, 210502, 210601

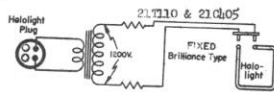


55-93706-4 Transformer - Power
37-77261-1 Resistor Variable 250K
35-633331-2 Resistor 33K 2W

Use mounting bracket and terminal board from the original 25 cycle supply. Remove all components (tubes, electrolytics, resistors) from the original supply when converting models 525, 526, 575, 577, 626, 677 the new variable resistor 37-77261-1 must be installed as the original supply used a 1 meg variable resistor, which if used with this supply would not enable proper halolight brightness to be attained. On these models the halolight supply socket on the chassis is wired to the 117 volt line and switch.

When converting models 217301, 210502, and 210601 remove the electrolytic tubes (6Xh) or rectifiers from the original 25 cycle supply. The variable resistor can be used from the original 25 cycle supply as it is the same part number as the one specified above. Remove all leads from the halolight supply socket on the chassis and tape the ends of these leads so they do not come into contact with any portion of the chassis. Rewire the halolight supply socket for 117 volt. (connect one lead to one side of the switch another lead to junction of 230-231, see 533 - 25 cycle variation).

CABINET MODELS



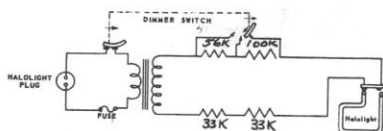
55-93706-4 Transformer - Power
35-633931-2 Resistor 39K 2W
35-634731-2 Resistor 47K 2W

Tinted Glass Models
use 39K
Clear Glass Models
use 47K

Use bracket and terminal board from the original 25 cycle supply. Remove electrolytics, transformer and one 6Xh from original 25 cycle supply bracket and terminal. One 6Xh must be left on the bracket and must be connected to the plug, as it is part of the series heater string. The halolite supply socket on the chassis does not require any altering.

CABINET MODELS

217208, 210508, 210509, 210608

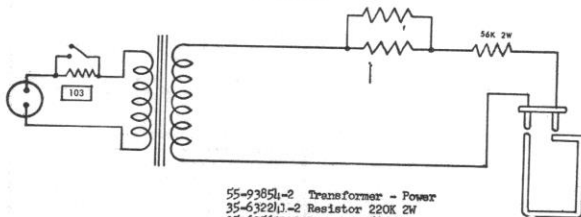


55-93706-4 Transformer - Power
35-633331-2 Resistor - 33K 2W
35-635631-2 Resistor - 56K 2W
35-431041-2 Resistor - 100K 1W

Use bracket and terminal board from the original 25 cycle supply. Remove electrolytics, transformer and one 6Xh from original 25 cycle supply on 217208, 210508 and 210509. One 6Xh must be left on the bracket and connected to the plug, as it is part of the series heater string on these models. On model 210608 all electrolytics, transformer and both 6Xh tubes must be removed.

CABINET MODEL

217101

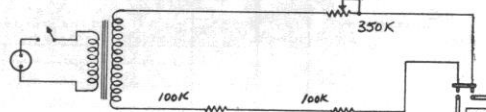


55-93854-2 Transformer - Power
35-632241-2 Resistor 220K 2W
35-635631-2 Resistor 56K 2W
35-633911-2 Resistor 390 Ohm 2W

Use bracket and terminal board from original 25 cycle supply. Remove all components from original 25 cycle supply, with the exception of the 22 ohm resistor which is part of the series filament heater circuit and must be left on the circuit. The halolite supply socket on the chassis does not require any altering.

CABINET MODELS

210501, 210603

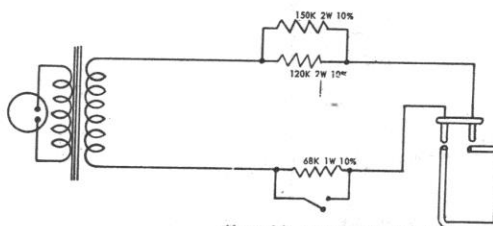


55-93854-2 Transformer - Power
35-631041-1 Resistor 100K 2W
37-78675-1 Resistor - Variable 350K

Use bracket and terminal board from the original 25 cycle supply. The halolite power supply socket on the chassis is connected directly to A.C. line thru switch, so no alteration is necessary.

CABINET MODELS

217102, 210401, 217201, 210501



55-93706-4 Transformer - Power
35-631541-1 Resistor 150K 2W
35-631241-1 Resistor 120K 2W
35-436831-1 Resistor 68K 1W

Use the mounting bracket and terminal board from the original 25 cycle supply. On model 217102, and 210401 remove all components from the original 25 cycle supply, (electrolytics, resistors, and one 6Xh) one 6Xh must be left on the bracket and the filament leads to it must be connected as it completes the series heater circuit in the set. All leads to the halolight supply socket on the chassis can be left connected.

On models 217201 and 210501 remove all components from the original supply and rewire to the above diagram. Remove all leads to the halolight supply socket, tape the ends of these leads. Rewire the halolight supply socket for 117 volt A.C. (connect one lead to one side of the A.C. switch, another lead to the junction of 230-231, see 533 - 25 cycle variation)

CHOKES, COILS AND TRANSFORMERS

| | | |
|------|-----------------|---|
| L200 | 57-85964-1 | Coil I.F. Input |
| L201 | 50-91531-2 | Coil - Filter |
| L202 | 50-91531-2 | Coil - Filter |
| L203 | 50-85953-1 | Coil - Peaking |
| L204 | 50-85953-2 | Coil - Peaking |
| L300 | 50-85965-1 | Coil - Trap |
| L301 | | Vertical Deflection Coil |
| L302 | | Vertical Deflection Coil |
| L303 | | Horizontal Deflection Coil |
| L304 | | Horizontal Deflection Coil |
| L400 | 50-85957-2 | Coil - Horizontal Hold |
| L401 | 50-92043-1 | Coil - Filter |
| L402 | 50-92043-1 | Coil - Filter |
| L403 | 50-94358-2 | Coil - Width |
| L404 | 50-92043-1 | Coil - Filter |
| L500 | 50-95698-2 | Choke - Line Filter |
| L501 | 50-95698-2 | Choke - Line Filter |
| L502 | 50-95698-2 | Choke - Line Filter |
| L503 | 50-95698-2 | Choke - Line Filter |
| L504 | 56-91588-1 to-5 | Choke B Filter |
| L505 | 50-85963-1-2 | Coil - Filament |
| L506 | 50-85963-1-2 | Coil Filament |
| L507 | 50-85963-1-2 | Coil - Filament |
| T100 | 50-85968-1 | Transformer Sound Discriminator |
| T101 | 56-91596-1-2-3 | Transformer - Audio Output |
| T200 | 57-85960-2 | Coil I.F. - Interstage # 1 |
| T201 | 57-85966-1 | Coil I.F. - Interstage # 2 |
| T202 | 57-85975-1 | Coil I.F. - Output |
| T203 | 57-85942-1 | Sound take-off and trap |
| T300 | 56-94273-1 | Transformer - Vertical Output |
| T400 | 50-94292-1 | Transformer - Horizontal Output |
| T600 | 55-93706-4 | Transformer - Halolight 60 cy. 21T114, 21C407) |
| T600 | 55-95768-1 | Transformer - Halolight 60 cy (21T213) |
| T601 | 55-95768-1 | Transformer - Halolight 60 cy (21C512) |

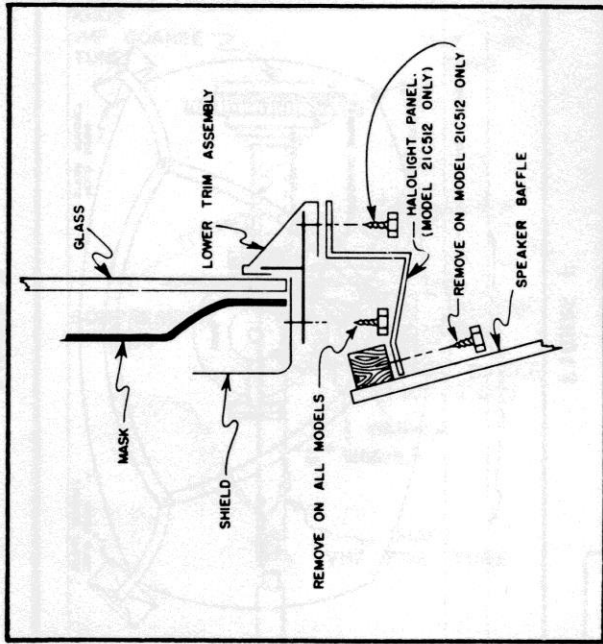


FIGURE I

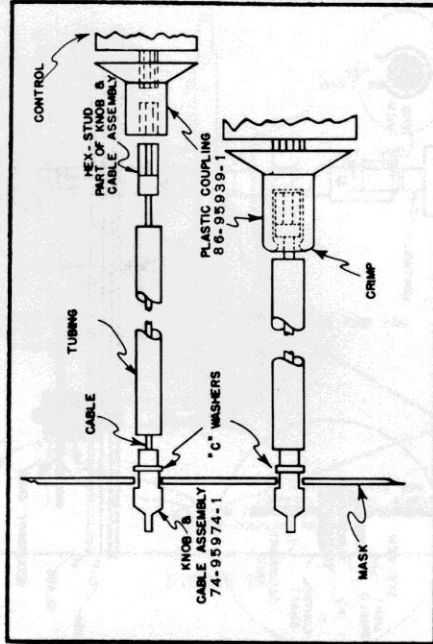
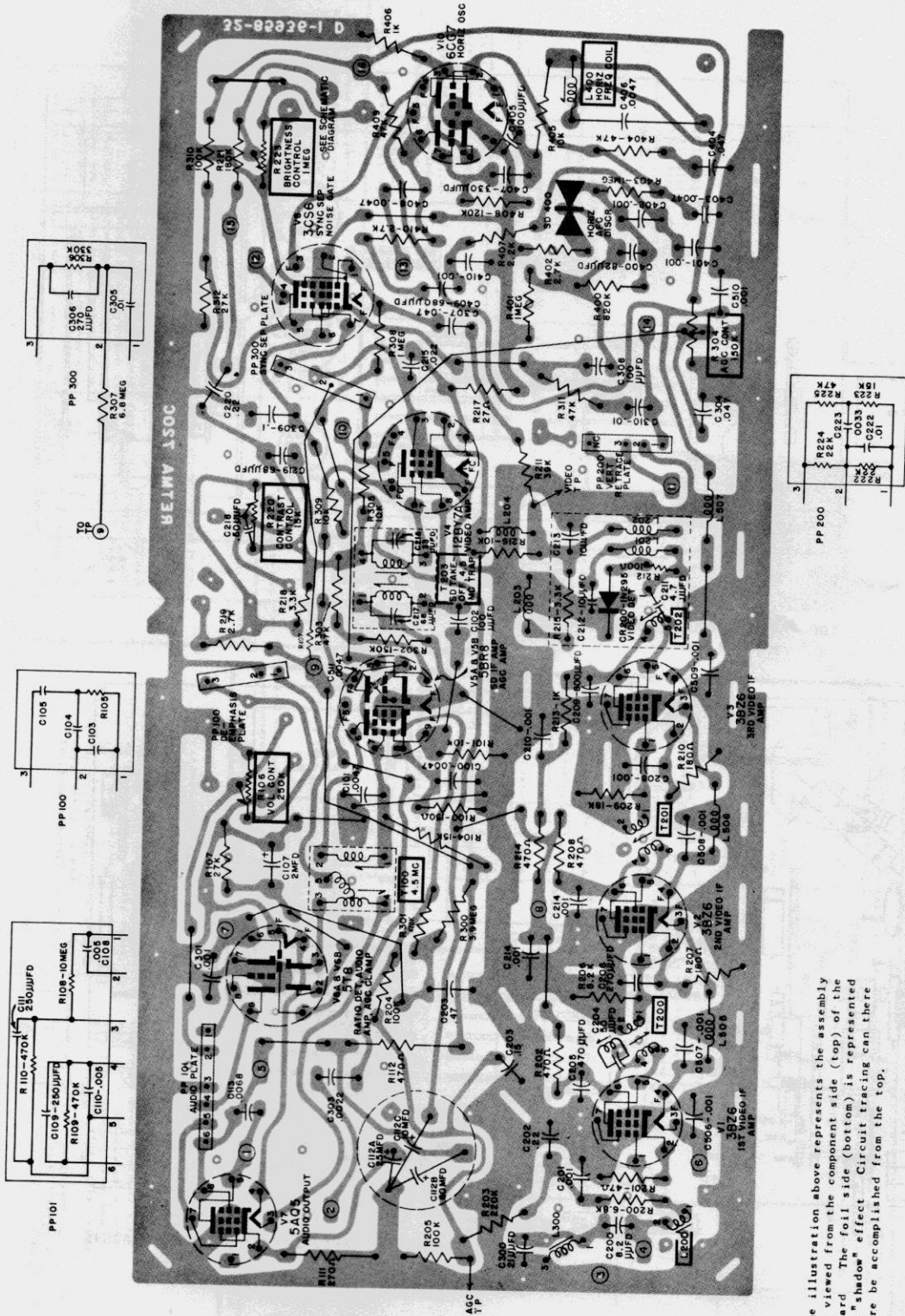
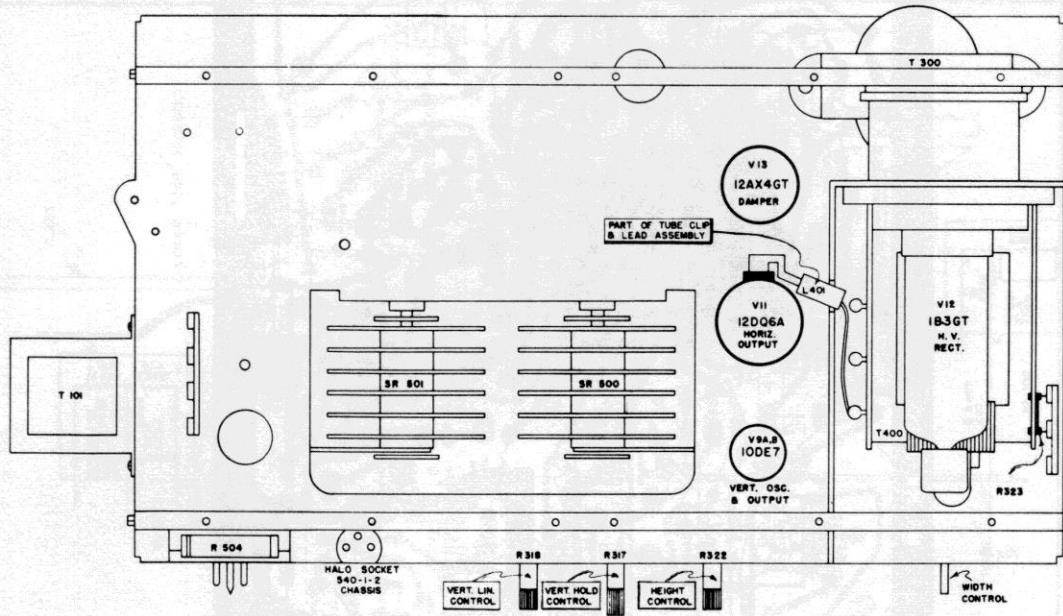


FIGURE J

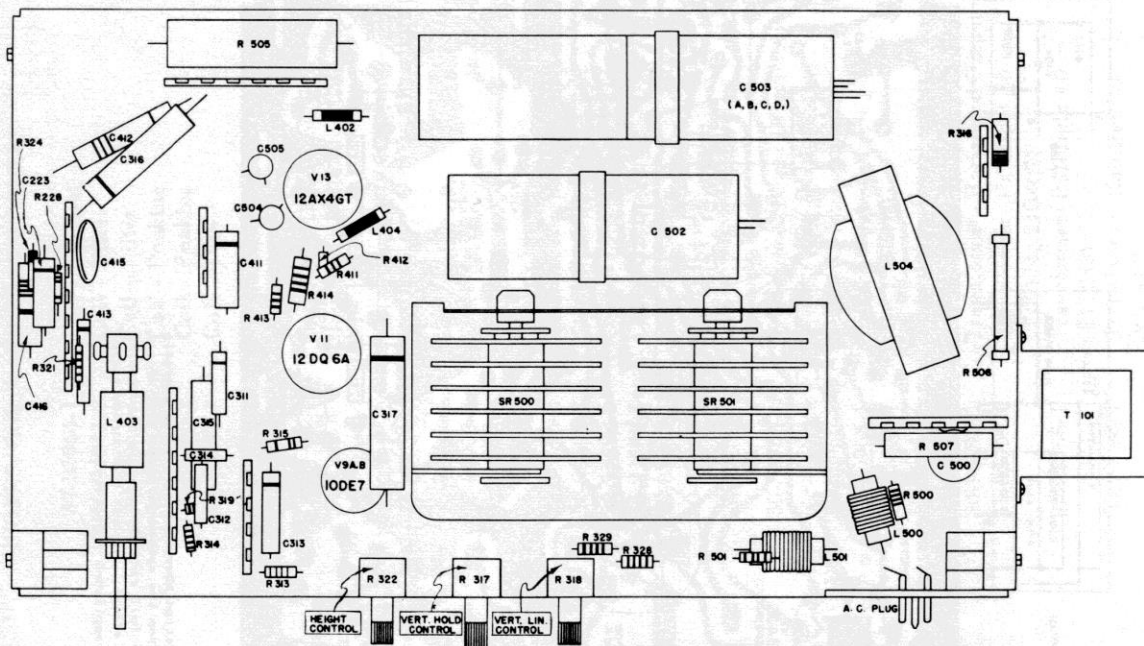
TOP DECK - PRINTED BOARD ASSEMBLY



The illustration above represents the assembly as viewed from the component side (top) of the board. The foil side (bottom) is represented in "shadow" effect. Circuit tracing can therefore be accomplished from the top.



TOP PARTS LAYOUT (LOWER) CHASSIS



BOTTOM PARTS LAYOUT (LOWER) CHASSIS

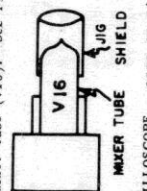
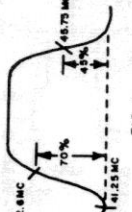
VIDEO IF, SOUND IF & 4.5 MC TRAP ALIGNMENT PROCEDURES

PRELIMINARY INSTRUCTIONS

1. Connect an isolation transformer between chassis and power line.
2. Use high scope gain and keep sweep generator output at lowest usable value; check, at intervals for possible sweep generator overloading by temporarily varying signal input level and noting any change (excluding amplitude) in response curve shape.
3. Keep marker generator coupling to a minimum to avoid distortion of response curve.
4. For optimum receiver alignment power line voltage should be maintained at 117 volts.
5. Receiver and test equipment should warm up for approximately 15 minutes before alignment.

VIDEO IF ALIGNMENT

| STEP | ALIGNMENT SETUP NOTES | TEST EQUIPMENT HOOKUP | ADJUST |
|------|---|---|---|
| 1. | Set VIF tuner to a free channel. Connect -5 volts DC source (-) term. to junction of R203 (220K) and R205 (100K) and (+) term. to chassis. Detune tuner converter plate coil by turning core fully counter-clockwise. | SWEEP GENERATOR through a .0047 Mfd DC blocking capacitor to pin 5 of L200. Set generator to 43.5 MC with 10 MC sweep. SIGNAL GENERATOR loosely coupled as a marker to sweep generator lead. OSCILLOSCOPE connected to video test point junction of R211 (39K) and L204, through a 33K resistor. | a. Adjust sweep generator output to produce response curve of 3V, peak to peak. b. Adjust T200 (top core) so that dip in response curve coincides with proper marker frequency (41.25). c. Adjust T202 for maximum response at 44.0 MC. d. Adjust T201 for maximum response at 45.3 MC. e. Adjust T200 (bottom core) for maximum response at 42.7 MC. f. Repeat steps c to e until 45.75 MC marker is at 45% and 42.6 MC marker is at 70% Adjust T202 to remove tilt Adjust T201 to position 45.75 marker Adjust T200 (bottom core) to position 42.6 MC marker (See Fig. 1) |
| 2. | Same as step 1. | Same as step 1. | Adjust L300 for minimum 47.25 MC marker amplitude. For optimum results repeat steps 1 & 2. |
| 3. | Leave 5 volt AGC voltage connected as in step 1. Set VIF tuner to a high band VHF channel which causes minimum distortion of response curve as fine tuning control is rotated. | Same as step 1. | Adjust tuner converter plate and L200 to give response shown below. For optimum results repeat steps 1 & 3 but do not detune tuner. |



REMOVE TEST EQUIPMENT AND RESISTORS

4.5 MC TRAP, SOUND IF & RATIO DETECTOR ALIGNMENT

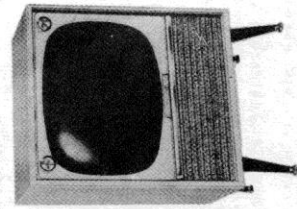
| STEP | ALIGNMENT SETUP NOTES | TEST EQUIPMENT HOOKUP | ADJUST |
|------|---|---|---|
| 1. | Set contrast control to maximum and brightness control to minimum. Connect -30 volts DC source (-) term. to junction of R203 (220K) & R205 (100K) and (+) term. to chassis. Connect a 4.5 MC series tuned circuit between yellow cathode lead of picture tube and ground. | VTVM Ground or "common" lead to junction of two matched 100K resistors connected in series across R107 (21K). DC probe through 100K resistor to terminal 1 of de-emphasis plate (P100). Isolate VTVM from ground. SIGNAL GENERATOR connected to video test point junction of R211 (39K) and L204. Set signal generator to 4.5 | For MAXIMUM reading: T100 (Top core) T203 (Bottom core) T203 (Top core) NOTE: Use peak resulting in greatest separation of cores. |
| 2. | Same as step 1. | VTVM RF probe connected across coil of series tuned 4.5 MC circuit SIGNAL GENERATOR same as step 1. | For MINIMUM reading: T203 (Bottom core). Using lowest signal generator output level, repeat steps 1 & 2 except T203 (bottom core). |
| 3. | Same as step 1 & 2. | Same as step 1. | For zero reading of T100 top core. Set VTVM to zero reading using lowest meter scale. At correct setting for T100 (top core), a slight turn of core will give a reading either up or down the scale. |

REMOVE TEST EQUIPMENT AND RESISTORS

ALTERNATE 4.5 MC ALIGNMENT

Connect a good antenna to the receiver and properly tune in a strong station. Adjust (T203 bottom core) for minimum 4.5 MC interference in the picture. This interference takes the form of a "grainy" appearance or a fine line pattern through the picture.

- CHASSIS:** 1-539-1,-2 1-540-1,-2 1-540-3,-4
MODELS: 21C407 SERIES 21C408 SERIES 21C409 SERIES 21C412 SERIES 21C413 SERIES 21C414 SERIES 21C415 SERIES 21C416 SERIES 21C417 SERIES 21C418 SERIES 21C419 SERIES 21C420 SERIES 21C421 SERIES 21C422 SERIES 21C423 SERIES 21C424 SERIES 21C425 SERIES 21C426 SERIES 21C427 SERIES 21C428 SERIES 21C429 SERIES 21C430 SERIES 21C431 SERIES 21C432 SERIES 21C433 SERIES 21C434 SERIES 21C435 SERIES 21C436 SERIES 21C437 SERIES 21C438 SERIES 21C439 SERIES 21C440 SERIES 21C441 SERIES 21C442 SERIES 21C443 SERIES 21C444 SERIES 21C445 SERIES 21C446 SERIES 21C447 SERIES 21C448 SERIES 21C449 SERIES 21C450 SERIES 21C451 SERIES 21C452 SERIES 21C453 SERIES 21C454 SERIES 21C455 SERIES 21C456 SERIES 21C457 SERIES 21C458 SERIES 21C459 SERIES 21C460 SERIES 21C461 SERIES 21C462 SERIES 21C463 SERIES 21C464 SERIES 21C465 SERIES 21C466 SERIES 21C467 SERIES 21C468 SERIES 21C469 SERIES 21C470 SERIES 21C471 SERIES 21C472 SERIES 21C473 SERIES 21C474 SERIES 21C475 SERIES 21C476 SERIES 21C477 SERIES 21C478 SERIES 21C479 SERIES 21C480 SERIES 21C481 SERIES 21C482 SERIES 21C483 SERIES 21C484 SERIES 21C485 SERIES 21C486 SERIES 21C487 SERIES 21C488 SERIES 21C489 SERIES 21C490 SERIES 21C491 SERIES 21C492 SERIES 21C493 SERIES 21C494 SERIES 21C495 SERIES 21C496 SERIES 21C497 SERIES 21C498 SERIES 21C499 SERIES 21C500 SERIES



MODEL 21C408 (21T115)

AGC ADJUSTMENT

- 1 Switch channel selector to strongest station in the area and adjust fine tuning control to correct tuning point
- 2 Adjust contrast and brightness controls to maximum.
- 3 Rotate AGC control (R304) clockwise until picture "bends" or "jumps" sideways
- 4 Reverse rotation of AGC control (R304) counterclockwise until picture is horizontally and vertically stable.

NOTE: For optimum performance the AGC control should be adjusted only under the conditions that the set will be operating.

- 5 Reduce contrast and brightness controls to normal setting. Rotate fine tuning to on or near correct tuning point. Normal picture should be observed. If this condition cannot be met rotate the AGC control a small amount further in the counter clockwise direction.
- 1 Set channel selector to strongest channel in the area and adjust fine tuning control to correct tuning point
- 2 Adjust vertical height vertical linearity and width control for normal picture
- 3 Rotate horizontal frequency control (L400) in either direction until picture falls out of horizontal sync (If picture fails to fall out of sync at the
- 4 Reverse rotation of frequency control slowly until picture falls into sync
- 5 Rotate channel selector to a position on which no signal is received; the picture should immediately fall into sync. If the picture does not fall into sync slightly readjust horizontal frequency control and repeat step 5

HORIZONTAL AFC & SYNCHRONIZATION CIRCUIT ADJUSTMENT

Before performing the following procedure check the AGC adjustment as described in "AGC Adjustment"

MODIFICATIONS AND CODE CHANGES

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION |
|--|-------------|-----------------------|
| CODE CHANGE 01 | | |
| Remove: | | |
| R318 | 37-95323-8 | Control Vertical Lin. |
| R328 | 35-332741-1 | 270K Resistor |
| R327 | 35-333951-1 | 3.9 meg. Resistor |
| Add: | | |
| R318 | 37-95323-10 | Control Vertical Lin. |
| CODE CHANGE 02 | | |
| Remove: | | |
| PP900 | 32-88098-1 | Plate Sync. take-off |
| R307 | 35-336855-1 | 6.8 meg. |
| Add: | | |
| PP500 | 32-88354-1 | Plate Sync. take-off |
| R307 | 35-338255-1 | 8.2 meg. resistor |
| CODE CHANGE 03 | | |
| (Effective 03-31-0077) | | |
| 1. To reduce radiation. | | |
| 2. To improve operation of A.G.C. | | |
| The following components are changed referring to the service schematic: | | |
| Remove: R303 47K and replace with a 58K $\frac{1}{2}W$ | | |
| Remove: R304 150K, part number 37-95955-5 and replace with a 190K part number 37-95570-1 | | |
| Add: An 18K $\frac{1}{2}W$ in series with R304 to the 220V B- line | | |
| Remove: R500 and 501 3300 ohm $\frac{1}{2}W$ and replace with 1500 ohm $\frac{1}{2}W$ | | |

CODE CHANGE 04

(Effect ve 540-1C-04-35-3425)

Reason for Change:

To remove Control with a stop incorporated and replace with a standard Control and a Resistor in series

- Remove: 37-95955-3 Brightness Control.
 Add: 37-95955-6 Brightness Control.
 Add: 470K 1/2W 20% Resistor in series with the Brightness Control to the 200V b.

Referring to top-deck Printed Board Assembly, remove jumper wire and add 470K Resistor.

CODE CHANGE 05

To improve on the vertical stability, the following components have been changed:

- Remove: Item PP 200, 32-85945-1, plate vertical retrace and replace with 32-85945-2.
 Remove: Item R 317 37-95323-7 control vertical hold and replace with 37-95323-13.
 Remove: Item C 314 - .001 mfd. 300 volt capacitor and replace with a .001 mfd., 500 volt capacitor.
 Remove: Item C 312 .0022 mfd., 400 volt and replace with a .0022 mfd. 1 KV capacitor.

The change in the vertical retrace plate referring to the schematic, on the -2, C 221 is changed to a .0068 and R 224 is changed to a 33 K. The change on the vertical hold control, the -13 is a 2 meg. control. The voltage rating on C 312 and C 314 has been increased because on field returns there has been an indication that these capacitors have a high pulse imposed and are breaking down causing insufficient vertical scan and poor stability

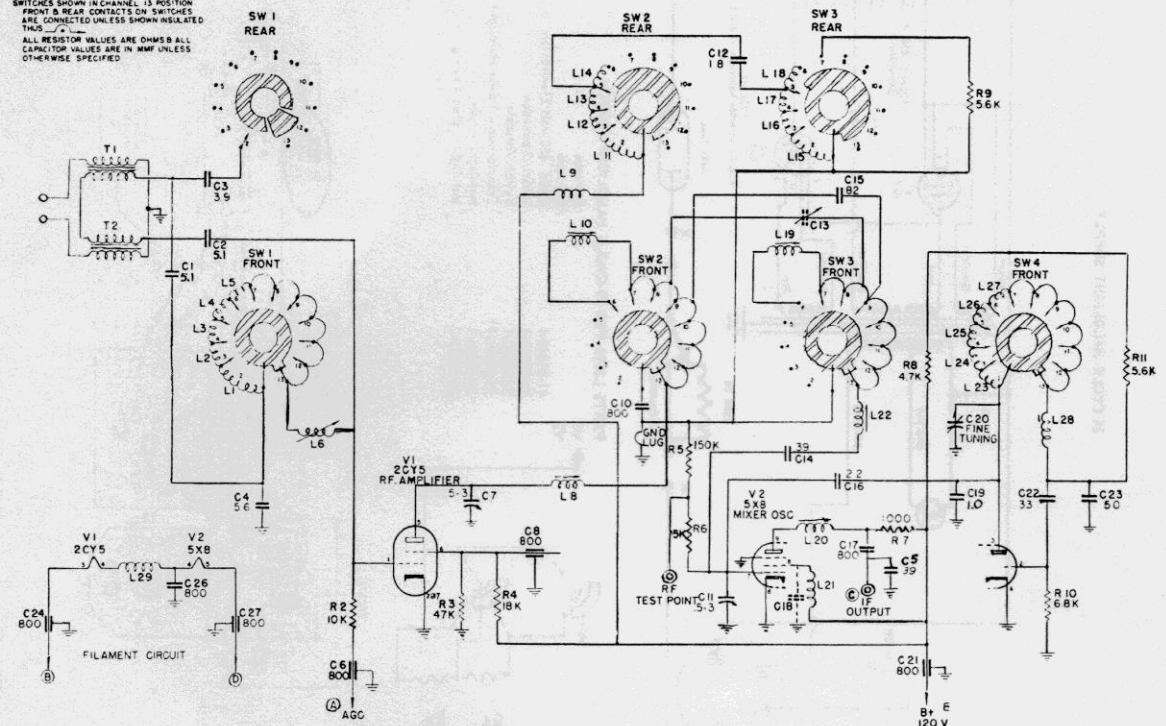
CODE CHANGE 06

- Remove: Resistor
 1.6 amp. Fuse and a 47 ohm Resistor added
 Only 785 set built this way

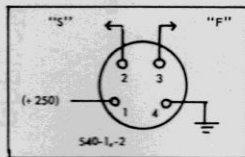
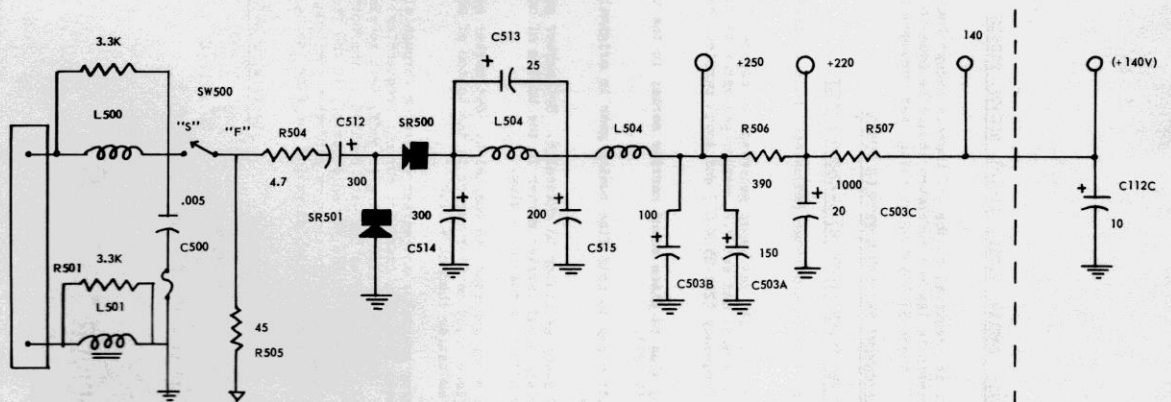
CODE CHANGE 07

- Remove: 1-6 amp Fuse
 Add: 2 amp. Fuse
 2 amp. Fuse Part Number 29-84399-22
 Fuse Holder Part Number 73-84460-6
 4. 7 ohm Resistor Part Number 36-92898-1

NOTES-
SWITCHES SHOWN IN CHANNEL 13 POSITION
FRONT & REAR CONTACTS ON SWITCHES
ARE CONNECTED UNLESS SHOWN OTHERWISE
THIS / a
ALL RESISTOR VALUES ARE OHMS & ALL
CAPACITOR VALUES ARE IN MMF UNLESS
OTHERWISE SPECIFIED



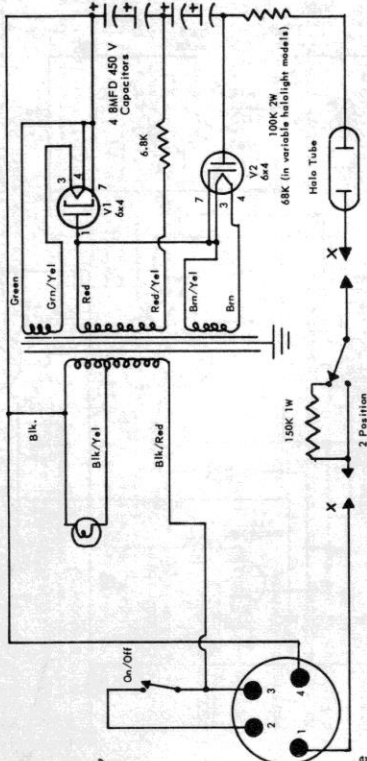
25 CYCLE POWER SUPPLY



To Pin #2
of 12DQ6A

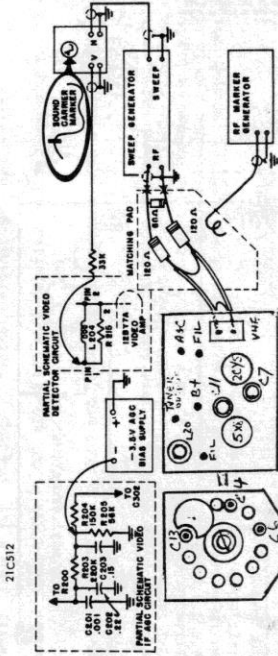
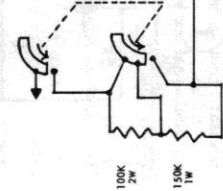
Printed BD

25 CYCLE HALOLIGHT SUPPLY



PARTS LISTS FOR 25 CYCLE HALOLIGHT SUPPLY

- 6A4 tube
- 6B4 tube
- 8 Mfd. 450 volt Electrolytic
- Switch 2 position
- Transformer - Power Halolight
- Halolight - tube
- Halolight - plug 4 prong
- 41-91644-1
- 33-94540-1
- 33-95952-1
- 55-88401-1
- 30-98586-1
- 73-40977-2



MODELS 21T115, 21T114, 21T213, 21C408, 21C407, 21C512

The 540 Chassis is identical to the 537 Chassis except for mechanical layout. Until the new Bulletin is issued, reference should be made to the 1-537-1, 540-1,3. A tetraode tuner 54-955-90-2 is being used throughout the line.

ALIGNMENT PROCEDURE TETRODE TUNERS

FOR VHF TUNER (TETRODE) 54-95590-2 ONLY

- Set fine tuning control to mid-range (adjustment hole to line up with channel 13 slug)
- Switch tuner to channel 13, set sweep generator to channel 13 (213 M.C. sweeping 10 M.C minimum) and set R.F marker generator to channel 13. Picture carrier frequency (211.25 M.C.) and sound carrier frequency to 215.75 M.C
- Adjust channel 13 slug to place sound carrier marker in the bottom of the co-channel trap (4.1.25)
- Insert non-induction peg to hold fine tuning gear in original position for all channels
- Rotate tuner and sweep generator to channel 6. Set marker generator 87.75 M.C. and place sound carrier marker in the bottom of co-channel (4.1.25) trap, by adjusting channel 4 slug.
- Rotate tuner and sweep generator to channel 4. Set marker generator to 71.75 M.C. and place sound carrier marker in the bottom of co-channel (4.1.25) trap by adjusting channel 4 slug.
- Rotate tuner, sweep generator and marker generator through all channels (refer to alignment frequency chart for correct frequencies) and sound marker location. Check that fine tuning is sufficient to place that appropriate sound carrier marker for each channel in the bottom of the co-channel (4.1.25) trap notch on the response curve. If the fine tuning is insufficient re-align oscillator slugs on different position on the fine tuning setting, depending on which direction the fine tuning range is not adequate.

| Tuner Setting | | Oscillator Adjustment | |
|---------------|-------------|-----------------------|--|
| 13 | | L13 | |
| 6 | | L6 | |
| 4 | | L4 | |
| Sweep Gen. | | Oscillator Adjustment | |
| | 215.75 M.C. | | |
| | 87.75 M.C. | | |
| | 71.75 M.C. | | |

C11, C7 adjusts gain and tilt of R.F. curve.

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